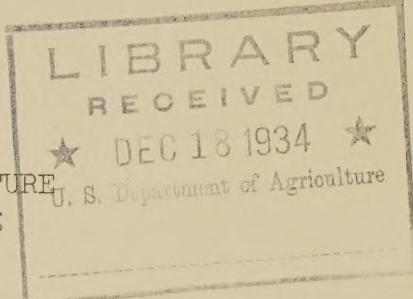


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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Engineering

CARE AND MAINTENANCE OF COTTON GINS AT THE CLOSE OF THE GINNING SEASON 1/

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(With acknowledgment to F. L. Gerdes, cotton technologist, Bureau of Agricultural Economics.)

For first-class operation during the coming season, the ginner, who has now about finished with this year's crop, should give his ginning plant a complete cleaning and a thorough inspection before he forgets the experiences and places where he was given trouble and expense.

From time to time the U. S. Cotton Ginning Laboratory has explained some of the more important factors or mechanical elements which influence ginning efficiency, but there are certain operating and maintenance practices which are also vital from a ginner's standpoint.

First among these is to have a clean gin, because it is profitable to the owner and permits elimination of fire hazards and many mechanical troubles. At the beginning and at frequent intervals during the season the gin plant should be cleaned, and then left clean when the last bale has been rolled out of the press box.

Second, after the shutdown, should come a thorough inspection and written tabulation of the items which need repair, replacement or re-alignment. Let us, for the sake of easy reference, make an alphabetical list of the more important items which we know should be checked over, as for example:

Airblast fan	Doffers	Motors
Airblast nozzles	Drives	Packing
Airblast piping	Electric grounding wires	Picker rollers
Bale boxes	Elevators	Press equipment
Bearings	Engines	Pulleys
Belts	Extractors	Pumps
Brushes	Fans	Rams
Buildings	Feeders	Ribs
Cleaners	Fire extinguishers	Roof
Clutches	Flues	Saws
Condenser	Gears	Telescope
Conveyors	Greasing	Tramper
Cotton piping	Idlers	Trash screws
Couplings	Lacing supplies	Vee-belts
Distributors	Mote boards	Windboards

Before discussing the gin stands themselves, let us note some of the sources of trouble which have frequently prevented a good start in a season and have also placed a heavy burden upon the ginner when his ginning work was already a load. Defective cotton piping or lint flues or airblast piping must be made air-tight. Joints can be taped with heavy manila adhesive paper, but extensive repairs or replacements require sheet metal working or tinsmith services. Shafting, boxes, ball bearings and power transmission items such as belts, vee-belts or ropes, and clutches may require alignment and repair.

A trouble maker that comes to my mind, as a result of bitter experiences when smooth running was being prayed for, has been the distributor and its belt. Wooden gin buildings may settle or become warped. If the distributor braces are stiff arms straight to the walls, the distributor will often be pulled out of line and become a pair of snake-like boxes in which the upper box serpentine in one direction and the lower box in the reverse. Weights of cleaning machinery imposed upon the distributor may still further aggravate this twist and mis-alignment. These factors cause the paper pulleys to wear off on one part faster than elsewhere, the spikes of the belt in turn are ground off on the under side of the belts when the pulley grooves disappear, and our experience has been that the spikes seem to have the habit of falling into the machinery always at the wrong time. Be sure, therefore, to align and repair your distributor when you have plenty of time to do a good job, because its satisfactory service is vital to continuous operation of your gin.

All overhead machinery is entitled to close scrutiny. The question of supports and fastenings are a "safety first" proposition all the time. The cleaning screens in cleaners and extractors need checking as to condition and correct position. Screens too close to the cylinders may cause "machining" of the cotton, and too far away may produce "roping" and rolling. Extractor saws or teeth receive severe abuse from rocks, sticks and foreign matter. These teeth should be re-aligned and kept in good shape.

Passing from the overhead machinery and distributor down to the gin stands, we frequently find it necessary to do work with the feeding mechanism which governs our rate of feed into the stands. Operating arms may be sprung, pinions on the "pancake" grid may be worn, or other repairs and replacements may have become vitally necessary to further operation.

In the gin stands themselves, I believe that ginners will agree with me in saying that much is overlooked. Of course, the saws must be sharpened as often as the work in any particular locality requires. This may vary from every 300 bales to only once per 1,000 bales. Gummimg and filing must retain the factory pitch and the circularity of the saws. Factory pitch may best be checked by using the gauges or gin-saw segments furnished by the manufacturers, but if neither of these is available the leading edge of the

saw tooth should be made to pass through the ribs parallel with the surface of the ribs or with the point of the tooth very slightly in advance. We know that a great deal of very poor sharpening is being done in the field by persons who take no pains to maintain factory pitch or alignment or true running saws. The best filing and gumming machines made are not automatic. They require good "horse sense" to operate and reasonable care in getting started correctly. With either plain gummers or combined gumming and filing machines, the tooth should be tapered on the sides so that the tip of the gin saw tooth is about one-half as thick as the saw disc or base of the tooth.

Ribs may not affect the appearance of your sample so much as they affect the percentage outturn; but their importance should not be overlooked. They should have clean straight edges with the sharpness barely removed, and the saw slots should be within two or three one-thousandths of being three saw-thicknesses in dimension. For some factories .117 inch is standard, but we have seen rib spacings with clean sharp ribs as much as .125 inch. Wider spaces than .117 inch somewhat tend to promote more rapid ginning; for which reason certain ginners will use strips of emery cloth on any new rib assemblies. This practice, however, is not recommended for any except highly skilled mechanics who have gauges to work by.

At the close of the season, both saws and ribs should be oiled with crude oil or other protective lubricant to guard against rust and corrosion during the idle period. Kerosene or white gasoline (without poisonous lead compounds) should be used to remove this protective coating when the ginning begins.

We have observed many dividing boards in brush gins which have never been touched from the day they left the factory. This board divides the saws and brushes, and it is important that its proportions be maintained. Some manufacturers provide their patrons with cheap metal covers to do this.

All operators of brush gins should give this board a close inspection and guard it against change in position or wear. When the board becomes worn, it changes the volume and direction of the brush blast upon the saws, it may seriously affect both the doffing and the moting actions, and it thus becomes a potential menace to making good samples. Likewise, the backboard or windboard which is above the brush at the back of the gin stand must be kept free from wear and sufficiently close to the brush tips so that "fly" and lint do not accumulate in wads above the brush. Few ginners give heed to these features, yet they are important.

Picker rollers should be checked for missing spikes, and be properly aligned so that the spikes center between saws. The amount that the saws protrude through the huller ribs also should be checked, as this is important in good huller front results. Some manufacturers have found that their saws should protrude more for long-staple than for short-staple cottons.

Brushes should by all means be given the best of attention, receiving protection from dampness, vermin and rodents, also being refilled when necessary and then carefully balanced. Ball-bearing balancing rigs or knife-edge balances may be home-made by the ginner if he is familiar with ways and means

for such work. Heavy wear of brushes has been noted from allowing them to mesh too deeply into the saws. Our experience at the U. S. Cotton Ginning Laboratory has pointed to allowing only about 1/8-inch lap when the saws and brushes are stationary, and this appears to be the experience of several manufacturers, also. When 12-inch saws run from 400 to 500 r.p.m., the tip speed of the brushes should be approximately 6,666 linear feet per minute. Thus we endeavor to run our 15-inch brushes at 1700 r.p.m., our 16-inch brushes at 1600 r.p.m., and our 18-inch brushes at 1420 r.p.m. Check your brush drives and speeds.

Airblast nozzles not only should be given occasional inspection to assure correct position and freedom from chokage, but also should be tested with a U-tube water gauge during operation of the gin to maintain correct doffing pressure. Various official publications of Cotton Ginners' Associations recently described the construction and use of this airblast gauge. In practice the nozzle position is set about 1/8-inch or more from the tips of the saw teeth, and the pressure should be from 10 to 16 inches (water gauge) depending upon regional conditions and types of cotton handled.

A contributing factor to vibration is the collection of lint and "fly" which will build up on fan blades, thus destroying the balance of the wheel and eventually becoming a menace to life and property. Because of the hazards incident to the use of fans, they require careful inspection of the wheels, blades, bearings, clearances and speeds.

Air volumes delivered by fans vary directly with the speed; and propelling power varies as the cube of the speed. Hence, the best and most economical operating conditions cannot be left to chance, but must be worked out to suit each individual installation.

Back-lash in lint flues also frequently results from excessive pressures at the airblast nozzle or too high brush speeds, causing the last gin stand in the line to give trouble and choke up the end of the lint flue. Daily inspection and cleaning of condensers and lint flues is a routine practice among progressive ginners.

Seed elevators and conveyors should be of the screw or helical flight type in preference to seed-blowing devices which are inefficient and costly in operation.

Press rams should be properly packed at reasonable intervals and petroleum oils should be used as the hydraulic fluid instead of water. Although such oils involve a slight expense, they prevent corrosion and protect the polished plunger surfaces and the working parts of the pump.

Regarding presses, some ginners do not give their gland packing much attention. I have seen ginners attempt to start a season, only to be forced again into idleness while waiting for new packing for their press. A ginner should be certain that he can operate his press before he allows the trumper to begin packing the farmer's cotton.

Fire is a continual threat to cotton gins. This necessitates repeated inspections of fire extinguishing apparatus and electrical ground wiring.

Care of the buildings and premises, to avoid roof leaks, to protect the machinery and to prevent serious fire hazards by frequently removing all clinging lint and dust, is essential to the good gins of today.

We have made it a practice to dip or paint all of our stock bolts, shafting, small tools, spare ball bearings, etc., with a thin mixture of lubricating oil and gasoline. This keeps them protected with a thin film of oil, and we do not have rusty threads or corroded material to work with.

And, finally, at the close of the season, be sure to roll up your flat belts and store them in a dry, safe place. If you cannot remove your vee-belts, at least you can release the tension in them. See that all of your tools are locked up in place for ready use; and then, with your ginning plant clean, repaired and in good shape, you can await the next season with confidence.

